AMENDMENTS TO THE CLAIMS

Please amend claims 1-5, 7, 8, 10, 12, 14, and 17-27 as follows.

Please add new claims 28 and 29 as follows.

1). (Currently amended) A method, comprising:

~~performing repeatedly edge profiling on a program using hardware and software, including directly measuring branch execution frequencies over an entire execution period of the program;~~

during execution of a program, repeatedly performing edge profiling, comprising:

detecting profile phase transitions in the program by profiling hardware; ~~repeatedly, wherein a profile phase transition is an indication that one or more cold program edges have become a corresponding number of hot program edges; and~~

updating profile phase transitions by the profiling hardware in response to detected profile phase transitions;

signaling profile phase transitions to a dynamic optimizer by the profiling hardware; and

optimizing the program by the dynamic optimizer based upon the profile phase transitions ~~and edge profile~~.

2). (Currently amended) The method of claim 1, ~~wherein performing repeatedly edge profiling comprises:~~ further comprising:

inserting edge profiling instructions by a compiler into the program;

arranging profile data by the compiler; and

executing the program.

~~using software to insert edge profiling instructions and arrange profile data;~~

~~executing the program; and~~

~~using hardware to update profile phase transitions, and signal phase transitions.~~

3). (Currently amended) The method of claim 2, wherein ~~using software to insert~~ inserting edge profiling instructions comprises modifying branch instructions to assign an identifier to one or more profiled edges, and to assign a value to an edge selection field.

4). (Currently amended) The method of claim 3, wherein ~~using software to insert~~ inserting edge profiling instructions further comprises inserting a profile identifier instruction when the profiled edge lacks at least one of a branch instruction; an initialize profile instruction; and a set offset instruction.

5). (Currently amended) The method of claim 2, wherein ~~using hardware~~ repeatedly performing edge profiling comprises translating edge profiling instructions into profile update operations by the profiling hardware.

6). (Original) The method of claim 4, further comprising:

loading a profile information register with a base address, an offset value, a trigger-counter, and a flag.

7). (Currently amended) The method of claim 5, further comprising:

intercepting with the profiling hardware the profiling instructions;

generating a profile update operation; and

updating profile counters.

8). (Currently amended) The method of claim 1, wherein ~~detecting profile phase transitions repeatedly,~~ signaling profile phase transitions comprises generating an interrupt signal by the profiling hardware when the profile phase transition occurs.

9). (Previously presented) The method of claim 8, further comprising:

determining if a program edge is hot, comprising

determining if the profiling instruction is executed, and

updating profiling counters associated with the profiling instruction;

determining if a cold edge becomes a hot edge, comprising

incrementing and decrementing trigger counters, and

detecting if trigger counters overflow and underflow;

preventing a false phase transition by detecting trigger counters underflow.

10). (Currently amended) A system, comprising:

a processor pipeline to generate a profile ID for each profiled edge, and generate profile update operations;

a profile information register coupled to the processor pipeline;

a first logic device to accept the profile update operations and profile ID to generate a memory buffer address;

a profile cache to accept the buffer address connected to the first logic device; and

a second logic device connected to the profile cache ~~configured~~ to generate a phase transition interrupt signal,

wherein the system performs edge profiling on a program including directly measuring branch execution frequencies over an entire execution period of the program, detects profile phase transitions repeatedly, wherein a profile phase transition is an indication that one or more cold program edges have become a corresponding number of hot program edges, and optimizes the program based upon the profile phase transitions.

11). (Original) The system of claim 10, wherein the processor pipeline

executes the program;

intercepts profiling instructions and updates profile counters; and

updates profile phase transition trigger counters, and signals phase transitions.

12). (Currently amended) The system of claim 11, wherein ~~the~~ software inserts edge profiling instructions for modifying branch instructions to assign an identifier to one or more profiled edges, and to assign a value to an edge selection field.

13). (Original) The system of claim 12, wherein the software while inserting edge profiling instructions, also inserts a profile identifier instruction when the profiled edge does not have a branch instruction; an initialize profile instruction; and a set offset instruction.

14). (Currently amended) The system of claim 11, wherein the system ~~processor~~ translates edge profiling instructions into profile update operations.

15). (Original) The system of claim 13, wherein the processor pipeline loads a profile information register with a base address, an offset value, a trigger-counter, and a flag.

16). (Original) The system of claim 14, wherein the processor pipeline:

intercepts the profiling instructions;

generates a profile update operation; and

updates profile counters.

17). (Currently amended) The system of claim 10, wherein the second logic device generates an interrupt signal when the profile phase transition occurs.

18). (Currently amended) The system of claim 17, wherein the system ~~processor~~:

determines if a program edge is hot, by determining if the profiling instruction is executed, updating profile counters associated with the profiling instruction, and determining if the trigger counters overflow;

determines if a cold edge becomes a hot edge, comprising

incrementing and decrementing trigger counters, and

detecting if trigger counters overflow and underflow;

prevents a false phase transition by detecting trigger counters underflow.

19). (Currently amended) A computer-readable medium having stored thereon a plurality of instructions, said plurality of instructions when executed by a computer, cause said computer to perform:

during execution of a program, repeatedly performing edge profiling, comprising:

~~performing repeatedly edge profiling on a program, including directly measuring branch execution frequencies over an entire execution period of the program;~~

detecting profile phase transitions in the program by profiling hardware; ~~repeatedly, wherein a profile phase transition is an indication that one or more cold program edges have become a corresponding number of hot program edges; and~~

updating profile phase transitions by the profiling hardware in response to detected profile phase transitions;

signaling profile phase transitions to a dynamic optimizer by the profiling hardware; and

optimizing the program by the dynamic optimizer based upon the profile phase transitions ~~and edge profile~~.

20). (Currently amended) The computer-readable medium of claim 19 having stored thereon additional instructions, said additional instructions when executed by [[a]] the computer ~~for using hardware and software to perform edge profiling on a program,~~ cause said computer to further perform:

inserting edge profiling instructions by a compiler into the program;

arranging profile data by the compiler; and

executing the program.

~~using software to insert edge profiling instructions and arrange profile data;~~

~~executing the program; and~~

~~using hardware to update profile phase transitions, and signal phase transitions.~~

21). (Currently amended) The computer-readable medium of claim 20 having stored thereon additional instructions, said additional instructions when executed by [[a]] the computer ~~for using software~~ to insert edge profiling instructions, cause said computer to further perform:

modifying branch instructions to assign an identifier to one or more profiled edges, and to assign a value to an edge selection field.

22). (Currently amended) The computer-readable medium of claim 21 having stored thereon additional instructions, said additional instructions when executed by [[a]] the computer ~~for using software~~ to insert edge profiling instructions, cause said computer to further perform:

inserting a profile identifier instruction; when the profiled edge does not have a branch instruction, an initialize profile instruction, and a set offset instruction.

23). (Currently amended) The computer-readable medium of claim 20, ~~having stored thereon additional instructions, said additional instructions when executed by a computer for using hardware, cause said computer to further perform~~ wherein repeatedly performing edge profiling comprises translating edge profiling instructions into profile update operations by the profiling hardware.

24). (Currently amended) The computer-readable medium of claim 22 having stored thereon additional instructions, said additional instructions when executed by [[a]] the computer, cause said computer to further perform:

loading a profile information register with a base address, an offset value, a trigger-counter, and a flag.

25). (Currently amended) The computer-readable medium of claim 23 having stored thereon additional instructions, said additional instructions when executed by [[a]] the computer, cause said computer to further perform:

intercepting with the profiling hardware the profiling instructions;

generating a profile update operation; and

updating profile counters.

26). (Currently amended) The computer-readable medium of claim 19 ~~having stored thereon additional instructions, said additional instructions when executed by a computer for detecting profile phase transitions repeatedly, cause said computer to further perform:~~

~~generating~~ wherein signaling profile phase transitions comprises generating an interrupt signal by the profiling hardware when the profile phase transition occurs.

27). (Currently amended) The computer-readable medium of claim 26 having stored thereon additional instructions, said additional instructions when executed by [[a]] the computer ~~for detecting profile phase transitions repeatedly~~, cause said computer to further perform:

determining if a program edge is hot, comprising

determining if the profiling instruction is executed, and

updating profile counters associated with the profiling instruction;

determining if a cold edge becomes a hot edge, comprising

incrementing or decrementing trigger counters, and

detecting if trigger counters overflow and underflow;

preventing a false phase transition by detecting trigger counters underflow.

28). (New) The method of claim 1 wherein signaling profile phase transitions to the dynamic optimizer by the profiling hardware comprises:

not signaling a profile phase transition if a false transition signal is detected by the profiling hardware.

29). (New) The computer-readable medium of claim 19 wherein signaling profile phase transitions to the dynamic optimizer by the profiling hardware comprises:

not signaling a profile phase transition if a false transition signal is detected by the profiling hardware.